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GLEN C. SANDERSON

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JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

Bailey

State of Nebraska

Project No. W-15-R Job No. 1-55

Title of Job White-tailed and Mule Deer Inventory

Objectives: To develop techniques for determining population trends and reproductive success.

PART I. GROUND SURVEYS

Procedure: Ground census routes, each approximately sixty miles in length, were established in Sioux, Dawes, and Sheridan counties. Counts were made at night, utilizing a spotlight that was mounted atop a sedan delivery vehicle. The counts were taken on calm evenings when there was little moonlight and were started immediately after it became dark enough to obtain a good beam from the spotlight. The routes were run at speeds under twenty miles per hour. When deer were located, identification as to sex and age was attempted, using either 7 x 50 binoculars or a 20 X spotting scope. Observations were recorded on prepared data sheets. Any animal not identified definitely as to age (adult or fawn) was recorded as unidentified, with appropriate notations if it could be identified as antlerless.

Findings:

Wildcat Hills

An attempt was made to establish a route in the Wildcat Hills area, but no routes of suitable length could be located. Most of the roads were too distant from cover to make observation practical. A tenative route, 77.4 miles in length, was run on September 16, 1955. Thirty-seven deer (an average of 0.44 deer per mile) were observed. All that could be identified were mule deer.

Pine Ridge

Pre-season Surveys -- Pre-hunting season counts were taken on the Sioux and Dawes County routes once each during August, October, and November. Due to limited time, counts were made on the Sheridan County route during August and October only. Results of the surveys are presented in Table I.

Of the pre-season surveys, October yielded the highest counts. The data are difficult to evaluate because of the variables from month to month that may have influenced observations. During August most of the corn was unharvested. This obstructed

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JOB COMPLETION REPORT

INVESTIGATIONS PROJECTS

State of Michigan

Project No. W-149-R Job No. R-1

Title of Job Habitat and Game Inventory

Objectives: To develop techniques for determining population trends and reproductive success.

PART I. GROUND SURVEYS

Procedure: Ground census routes, each approximately sixty miles in length, were established in Clare, Osceola, and Montcalm counties. Checks were made at night, utilizing a spotlight that was mounted atop a sedan delivery vehicle. The routes were taken on calm evenings when there was little moonlight and were started immediately after it became dark enough to obtain a good beam from the spotlight. The routes were run at speeds under twenty miles per hour. Deer were recorded, identification as to sex and age was attempted, using either 7 x 50 binoculars or a 20 X spotting scope. Observations were recorded on prepared data sheets. Any animal not identified definitely as to age (adult or fawn) was recorded as unidentified. With appropriate notations it could be identified as antlerless.

Findings: Wildcat Hills

An attempt was made to establish a route in the Wildcat Hills area, but no routes of suitable length could be located. Both of the roads were too distant from cover to make observation practical. A tentative route, 77.4 miles in length, was run on September 16, 1952. Ninety-seven deer (an average of 0.4 deer per mile) were observed, all that could be identified were bucks.

Elk Flats

Pre-season surveys -- Three-hundred sixty-six counts were taken on the Elk and Flows County route once each during August, October, and November. One hundred two counts were made on the Montcalm County route during August and October only. Results of the surveys are presented in Table 1.

In the pre-season surveys, October yielded the highest counts. The data are difficult to evaluate because of the variables from month to month that may have influenced observations during August and of the corn was unharvested. This obstructed

TABLE I

Results Of Spotlight Surveys In The Pine Ridge For August, October, and November of 1955, and January of 1956

ROUTE	PERIOD	DATE	FAWNS	ADULT MALES	ADULT FEMALES	UNIDENT-IFIED	TOTAL	*LENGTH OF ROUTE (MI.)	NO DEER OBSERVED PER MILE
SIOUX	Pre-season	Aug. 23	11	24	30	23	88	**69.9	1.26
		Oct. 10	47	19	49	40	155	60.6	2.56
		Nov. 22	23	14	23	53	113	58.8	1.92
		TOTALS	81	57	102	116	356	189.3	1.88
	Post-season	Jan. 12	15	2	9	33	59	58.9	1.00
DAWES	Pre-season	Aug. 25	23	19	23	3	68	61.1	1.11
		Oct. 12	46	7	36	31	120	57.2	2.10
		Nov. 23	29	10	21	21	81	56.3	1.44
		TOTALS	98	36	80	55	269	174.6	1.56
	Post-season	Jan. 23	16	7	12	39	74	56.7	1.30
SHERIDAN	Pre-season	Aug. 26	12	11	16	5	44	61.7	0.71
		Oct. 13	14	16	9	8	47	62.2	0.76
		TOTALS	26	27	25	13	91	123.9	0.73

* As measured by odometer of automobile.
** Route later shortened.

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Results Of Spotlight Surveys In The Pine Ridge For August, October, and November of 1955, and January of 1956

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STOCK	Pre-season	Aug. 23	11	21	30	23	88	**69.9	1.26
		Oct. 10	17	16	19	40	155	60.6	2.56
		Nov. 22	23	14	23	53	113	56.4	1.92
		TOTALS	51	51	72	116	356	186.7	1.88
	Post-season	Jan. 12	15	2	9	33	59	58.9	1.00
DAVES	Pre-season	Aug. 25	23	19	23	3	68	61.1	1.11
		Oct. 14	46	7	36	31	120	52.2	2.10
		Nov. 23	29	10	21	21	81	56.3	1.44
		TOTALS	98	36	80	55	269	171.6	1.56
	Post-season	Jan. 23	16	7	12	19	74	55.7	1.10
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		Oct. 13	14	16	9	8	47	62.2	0.76
		TOTALS	26	27	25	13	91	123.9	0.73

* As measured by odometer of automobile.

** Route later shortened.

observation and probably accounted for the smaller numbers of deer observed when compared to the succeeding surveys. The small number of deer observed during November, when compared to October, cannot be explained from the present data. All deer that could be identified during the surveys were mule deer.

Sex and age ratio data obtained from the spotlight counts varied considerably between months, especially between August and the two succeeding counts in October and November. Some of the variation can probably be attributed to the small sample for each month. The high ratio of bucks to does during August, when compared to the October and November sex ratios, was the opposite of that which was expected. During October and November, the adult males were expected to be more readily observed, due to the rutting season. The low doe:fawn ratio in August may have been the result of heavy cover, tending to make the fawns more difficult to observe. Pre-season sex and age ratios are shown by months in Table II.

TABLE II

Pre-season Sex and Age Ratios In The Pine Ridge Area As Indicated By The Results Of Stotlight Surveys

Month	Sex & Age Ratios (adult males: adult females: fawns)			No. In Sample
August	78	100	67	169
October	45	100	114	243
November	55	100	118	120

One hundred and fifty-three random observations were made on mule deer from September through November. Observations were made during both the day and in the evenings with a spotlight. Sex and age ratios from the random observations were 64 adult males:100 adult females:64 fawns.

When survey counts and random observations are combined (sample of 685 animals), sex and age ratios of 59 adult males:100 adult females:90 fawns are indicated. When compared to counts of one year earlier, it appears that a higher ratio of bucks to does occurred in 1955, while the number of fawns to adult does was lower. Sex and age ratios obtained in 1954, based on 466 observations, were 25 adult males:100 adult females:125 fawns. This suggests that reproduction may have been less successful in 1955 than in 1954.

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August	78	100	67	309
October	45	100	114	243
November	55	100	118	120

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Spotlighting, as conducted during 1955, may not yield a true picture of sex ratios. Bucks with large antlers were easily identified at distances too great to separate does from bucks with small antlers or to separate does from fawns. Consequently, some bucks were identified where others, such as does and fawns, may have been placed in an unidentified catagory. Most of the unidentified animals were believed to have been anterless. This would tend to yield a buck:doe ratio that is slightly high.

Post-season Surveys -- Post-season counts were taken on the Sioux and Dawes County routes during January. Limited time and inclement weather again prohibited making counts in Sheridan County. The results of the post-season surveys are included in Table I.

In Sioux County, 47.8 per cent fewer deer were noted during January than in November and 61.9 per cent fewer than in October. In Dawes county, 8.6 per cent fewer deer were noted in the January counts than in those of November, and 38.3 per cent fewer than in October.

These data should not be considered indicators of changes in the deer population for they may be influenced drastically by the immediate behavior of the deer. For instance, it was obvious that the deer began moving into open areas much later on the evening of the January survey than during either the October or the November counts. In the January count, only three deer were observed from 5:45 P.M. to 8:40 P.M., or on the first 46 miles of the route. From 8:40 P.M. until the completion of the route at 10:55 P.M., or within the final 12.9 miles, 56 deer were noted. On the October and November counts, deer were noted regularly on the first portion of the route during the early hours of evening. Reasons for this altered behavior were not apparent for conditions were very similar for the January and October counts.

Post-season observations on 144 mule deer indicated sex and age ratios of 72 adult males:100 adult females:116 fawns.

Comparative Population Densities In The Pine Ridge -- From the data obtained in the spotlight surveys, it appears that the density of deer in the Pine Ridge decreases from the west to the east. Using the data taken during October, Sioux County had the highest density with 2.56 deer observed per mile, followed by Dawes County with 2.1 deer per mile and Sheridan County with 0.76 deer per mile. Counts during August and November indicated similar distribution. Figure 1 indicates comparative population densities based on data from the spotlight surveys. The numbers of deer observed per mile may be in

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Post-season observations on 114 male deer indicated sex and age ratios of 72 adult male:100 adult female:116 fawns.

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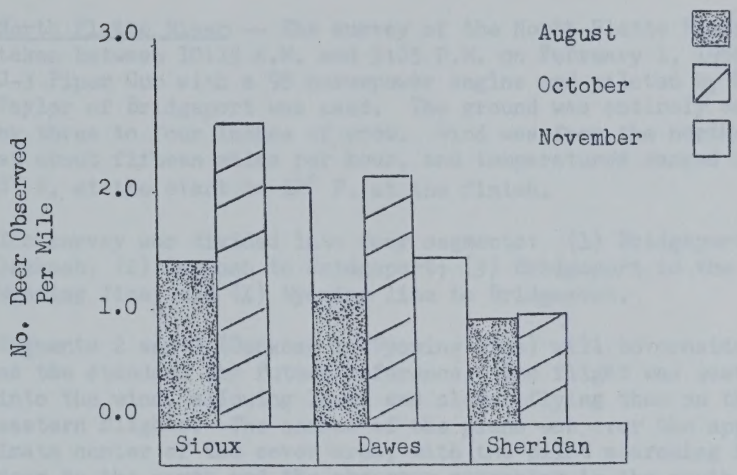
error slightly since mileage, based on odometer readings of the automobile, varied considerably for the same routes (Table I).

FIGURE 1
Frequency of deer observations along Spotlight Routes In Sioux, Dawes, And Sheridan Counties



Recommendations:

1. The three spotlight routes should be divided into six routes, each twenty miles in length. A sixty mile route is too long for one person to complete efficiently in one night. Monotony and fatigue decrease the ability to observe adequately on longer routes. Proposed routes are shown in the appendix.

2. Spotlighting activities should be confined to October for the pre-season counts. Post-season counts should be taken as soon as possible after the close of deer season.

3. All deer observed within the range of the spotlight should be recorded for population trend data. For sex and age ratio data, only those observations should be used that are within a range in which all deer can be easily identified. This would tend to eleminate biases due to difficulty of identification.

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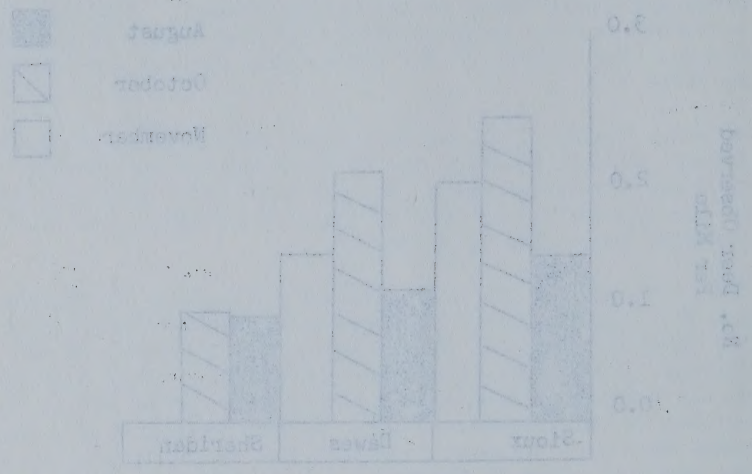

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PART II. AERIAL SURVEYS

Procedure: High-winged aircraft of low cruising speeds were used for these surveys. Flights were made at altitudes as low as considered safe by the pilot, usually varying from fifty to 250 feet, depending on height of cover and terrain. The surveys were flown on calm days when the ground was covered completely by snow. The plane was kept on a direct course unless deer were sighted. When deer were located, they were circled to obtain a complete count of the band.

Findings: North Platte River -- The survey of the North Platte River was taken between 10:15 A.M. and 3:25 P.M. on February 1, 1956. A J-3 Piper Cub with a 95 horsepower engine and piloted by Ernest Taylor of Bridgeport was used. The ground was entirely covered by three to four inches of snow. Wind was from the northwest at about fifteen miles per hour, and temperatures ranged from 3° F. at the start to 12° F. at the finish.

The survey was divided into four segments: (1) Bridgeport to Oshkosh; (2) Oshkosh to Bridgeport; (3) Bridgeport to the Wyoming line; and (4) Wyoming line to Bridgeport.

Segments 2 and 3 (Oshkosh to Wyoming line) will be considered as the standard for future reference. The flight was west and into the wind, allowing lower and slower flying than on the eastern flights. The course of the plane was over the approximate center of the cover area, with the pilot searching for deer to the north and the observer searching to the south. The following is a record of observations from Oshkosh to the Wyoming line, broken down to specific location to present a picture of spatial distribution deer observed.

Location	Number Of Deer Observed
Oshkosh to Lisco Bridge	17
Lisco Bridge to Broadwater Bridge	0
Broadwater Bridge to Bridgeport	2
Bridgeport to Union Pacific RR Bridge	31
Union Pacific Bridge to Bayard Bridge	4
Bayard Bridge to McGrew	0
McGrew to Minatare Bridge	0
Minatare Bridge to Scottsbluff Airport	24
Scottsbluff Airport to 1st bridge west of Scottsbluff	0
1st bridge west of Scottsbluff to Mitchell Bridge	6
Mitchell Bridge to Morrill Bridge	17
Morrill Bridge to Wyoming line	0
Total Deer Observed	101

The course of the plane on the eastward flights (Bridgeport to Oshkosh and the Wyoming line to Bridgeport) was along the southern edge of the river bottom cover and both pilot and observer searched cover to the north. The ground speed was probably about ten miles per hour greater than on the westward flights because of a tail wind. Thirty-nine deer were noted between the Wyoming line and Bridgeport and seven were observed between Bridgeport and Oshkosh. Eight of the 39 were known to have been counted in the westward flight.

A total of 139 different deer were observed on all flights as compared to 72 observed during the 1954 survey. All deer observed were mule deer.

Missouri and Niobrara River Surveys -- Counts were taken on the Missouri and Niobrara Rivers on February 7, 1956. A J-3 Piper Cub with a 65 horsepower engine and piloted by Andrew Risser of Norfolk was used. The wind was from the southwest at eight to ten miles per hour. Four to five inches of snow covered the ground completely. Ground speed was between fifty and sixty miles per hour.

Counts were started immediately west of South Sioux City at 8:30 A.M. The course of the plane was directed over the approximate center of the cover areas with the pilot searching to one side of the plane and the observer to the other. The flight was continuous from South Sioux City to the bridge south of Spencer on the Niobrara River with the exception of a re-fueling stop at Yankton. The counts were completed at 11:50 A.M.

The following is a record of observations, compared to those made on March 1, 1955.

Location	No. Of Deer Observed March 1955	February 1956
South Sioux City to Yankton	33	57
Yankton to Niobrara	22	3
Niobrara to Spencer	11	0
TOTALS	66	60

Approximately nine per cent fewer deer were noted in 1956 than in 1955. The lower count in 1956, at least in part, is probably due to the flooding of river bottoms between Yankton and Niobrara by the back waters of Gavin's Point Dam. All deer observed were whitetails.

Elkhorn River Survey -- The Elkhorn River survey was taken on February 8, 1956, using the same pilot and plane as used in the Missouri River counts. Wind was from the north at about ten

miles per hour but increased to 20 to 25 miles per hour before the counts were completed. Three to four inches of snow blanketed the ground. Time of departure from Norfolk was 7:35 A.M. and the counts were completed at 10:30 A.M.

The route that should be considered as the standard for determining population trends, was flown from Beemer west to the first bridge west of Clearwater. The course of the plane was again over the center of the river bottom cover with the pilot searching to one side of the plane and the observer to the other. The following is a record of deer observed.

Location	No. Of Deer Observed
Beemer to Wisner	16
Wisner to Pilger	3
Pilger to Stanton	22
Stanton to Norfolk	0
Norfolk to Battle Creek	7
Battle Creek to Meadow Grove	4
Meadow Grove to Oakdale	0
Oakdale to Neligh	0
Neligh to 1st bridge west of Clearwater	34
TOTAL	86

While flying from Norfolk to Beemer where the count was started, 23 white-tailed deer were noted. Four of these were again counted during the survey. In all, 105 different deer were believed to have been observed. A band of 34 was noted approximately three miles west of Neligh.

All deer that could be identified were whitetails, although a mule deer buck, and possibly others, was believed to be in the large band of 34 west of Neligh. Timber and the behavior of the herd precluded positive identification.

Since the 1956 survey was the initial count on the Elkhorn River, no comparisons with past years can be made for population trends.

Recommendations:

1. The observer and pilot should concentrate on observations of deer only on the standard routes. Attempts to estimate waterfowl distract the observers and could affect the survey significantly.

2. If possible, the direction of flight should be into the wind to allow slower flight speeds.

3. The survey should be continued as described to aid in determining population trends.

Summary: Pre-hunting season and post-hunting season spotlight counts of deer were made on three routes in Sioux, Dawes, and Sheridan Counties. Pre-season counts were made during August, October, and November. Post-season counts were made in January. October counts were higher than those taken in August and November. Since these were initial surveys of this type, no comparisons with past years can be made to determine population trends.

In Sioux County, 47.8 per cent fewer deer were noted in the post-season count than in November and 61.9 per cent fewer than in October. In Dawes County, 8.6 per cent fewer deer were noted in January counts than in November, and 38.3 per cent fewer than in October. It is believed that lower counts in January resulted primarily from altered behavior of the deer.

Data from the spotlight surveys indicate that deer density in the Pine Ridge decreases from the west to the east.

Pre-season observations on 685 mule deer indicated sex and age ratios in the Pine Ridge of 59 adult males:100 adult females: 90 fawns, as compared to 25 adult males:100 adult females:125 fawns in 1954, based on 466 observations.

Post-season observations on 144 mule deer in the Pine Ridge indicated sex and age ratios of 72 adult males:100 adult females:116 fawns.

During an aerial survey of the North Platte River on February 1, 1956, 139 deer were noted between Oshkosh and the Wyoming line. This compares to 72 observed during an aerial survey in February, 1955.

Aerial counts of deer were taken on the Missouri and Niobrara Rivers between South Sioux City and Spencer on February 7, 1956. Sixty white-tailed deer were observed as compared to 66 noted during March, 1955. Flooding of river bottoms from Yankton to Niobrara by the back waters of Gavin's Point Dam probably accounted for the fewer numbers of deer observed.

Aerial counts were taken on the Elkhorn River from Beemer to Clearwater on February 8, 1956. A total of 105 deer was observed. Since the 1956 survey was the initial count on the Elkhorn River, no comparisons can be made with past years to determine population trends.

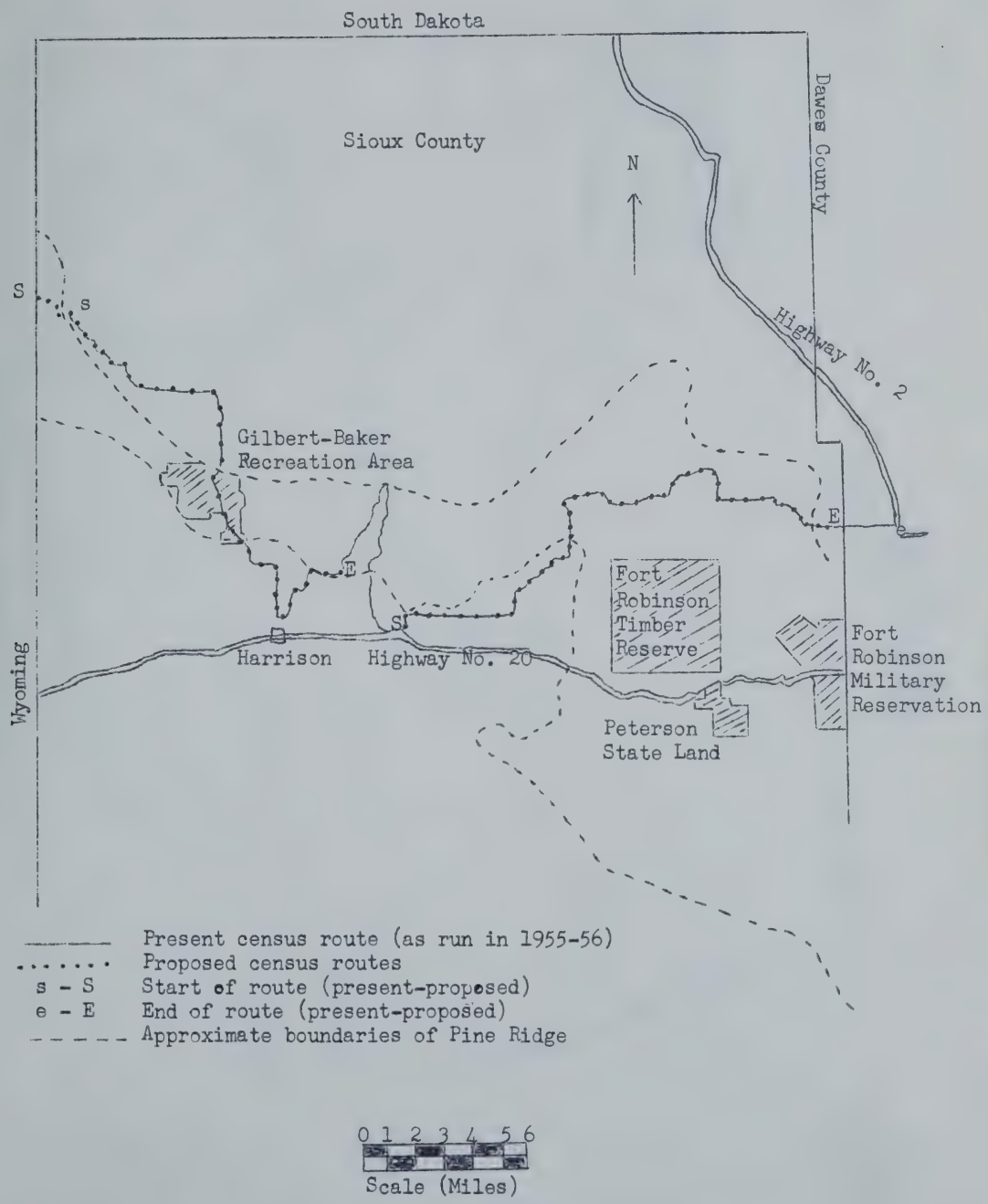
Prepared by William J. Bailey, Jr.
Game Manager

Approved by Phil Agee
Project Leader

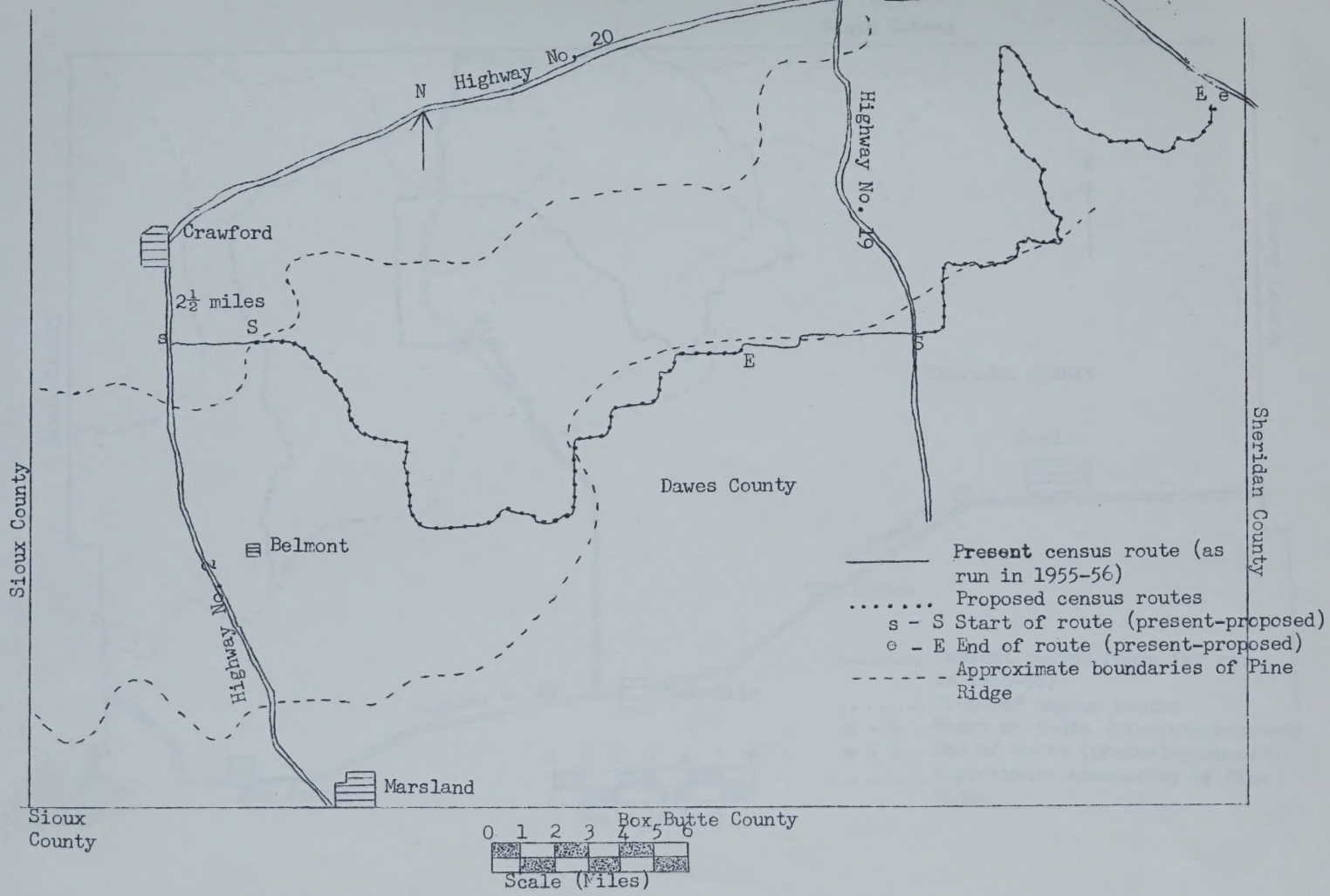
Date: February 25, 1956

A P P E N D I X

SPOTLIGHT CENSUS ROUTES IN SIOUX COUNTY

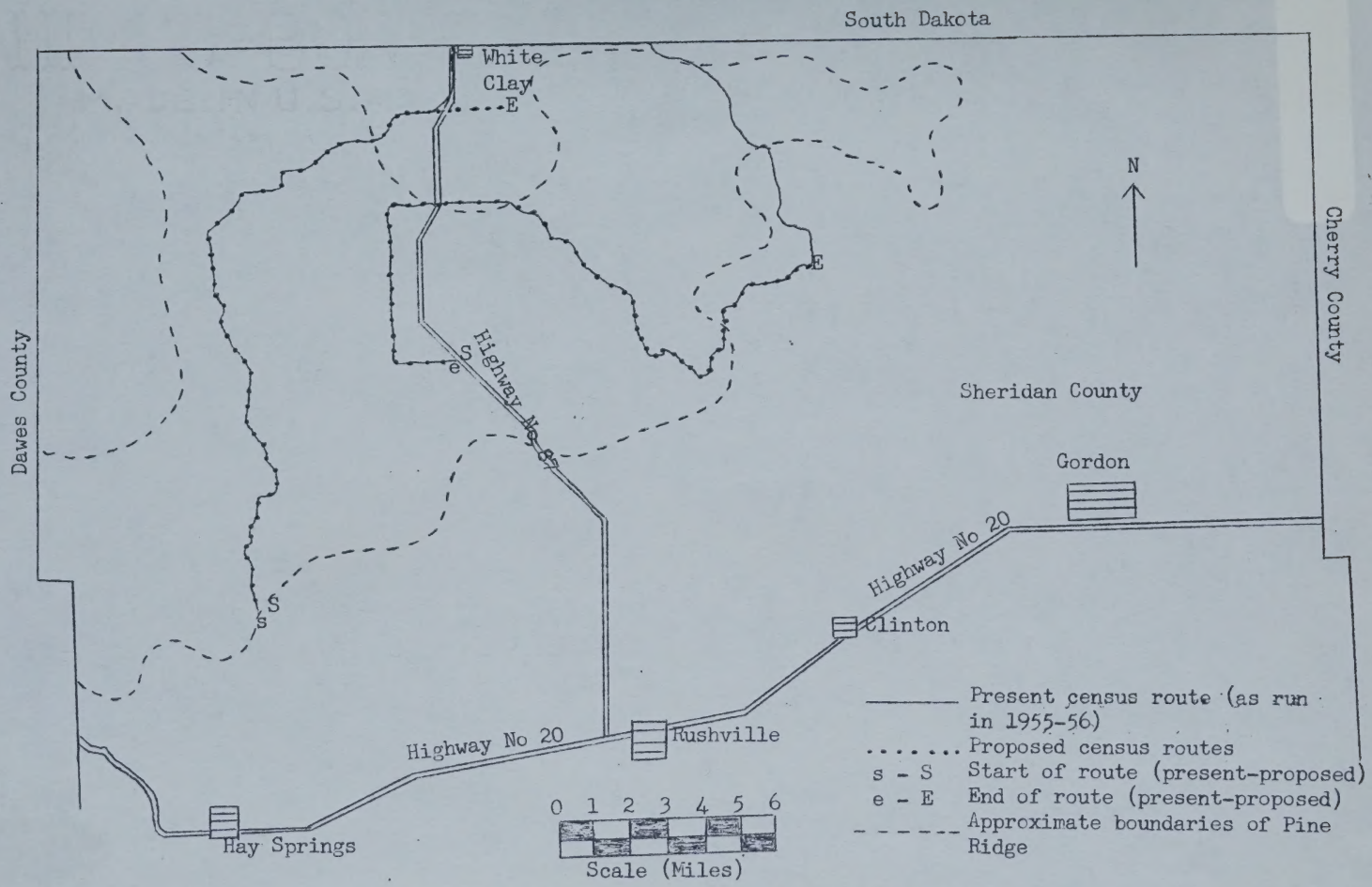
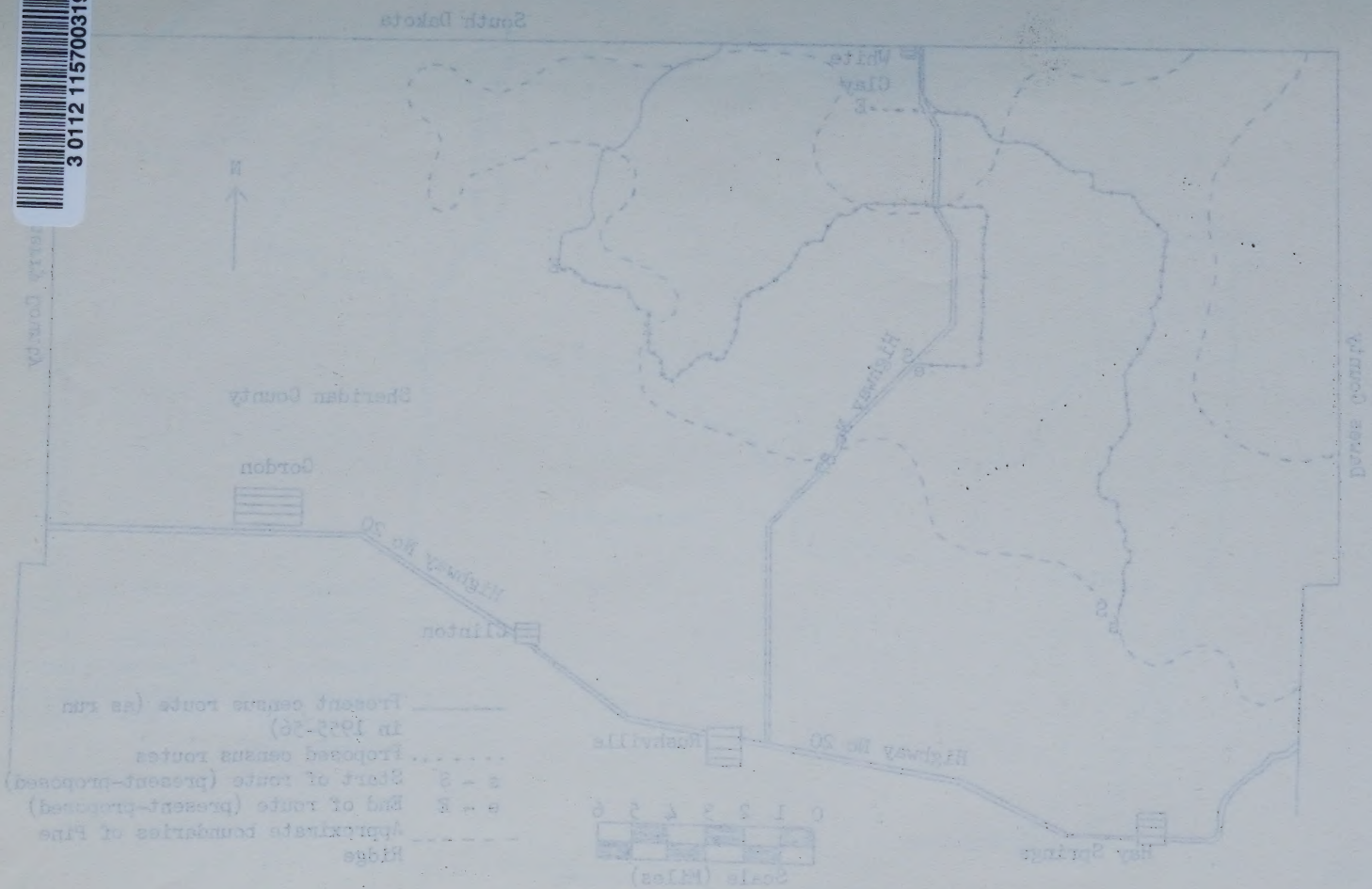


SPOTLIGHT CENSUS ROUTES IN DAWES COUNTY



Sheridan County
Valley County
Garfield County
Wheatland
Golden Valley
Musselshell
Petroleum
Fergus
Judith Basin
Meagher
Highway No. 19
Lewistown
Denton
Stanford
Geyser
Moccasin
Belt
Belt Creek
Great Falls
Cascade
Sun River
Vaughn
Simms
Ulm
Sand Coulee
Stockett
Armington
Raynesford
Monarch
Neihart
Barker
Kingston
Utica
Square Butte
Highwood
Shonkin
Ryegate
Roundup
Musselshell
Melstone
Lavina
Reedpoint
Big Timber
Livingston
Clyde Park
Wilsall
Ringling
Chico
Gardiner
Cooke City
Yellowstone National Park
Yellowstone County
Stillwater County
Sweet Grass County
Park County
Meagher County
Fergus County
Cascade County
Golden Valley County
Musselshell County
Wheatland County
Sheridan County
Valley County
Garfield County
Petroleum County
Judith Basin County
Miles
0 1 2 3 4 5
Scale (Miles)
Highway
Railroad
Stream
Lake
Boundary between Meagher and Wheatland counties
Boundary between Meagher and Sweet Grass counties
Boundary between Meagher and Park counties
Boundary between Meagher and Cascade counties
Boundary between Meagher and Golden Valley counties
Boundary between Meagher and Musselshell counties
Boundary between Meagher and Petroleum counties
Boundary between Meagher and Fergus counties
Boundary between Meagher and Judith Basin counties
Boundary between Meagher and Sheridan counties
Boundary between Meagher and Valley counties
Boundary between Meagher and Garfield counties
Boundary between Meagher and Yellowstone counties
Boundary between Meagher and Stillwater

SPOTLIGHT CENSUS ROUTES IN SHERIDAN COUNTY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